Chesapeake Bay Program Partnership's Basinwide BMP Verification Framework:

Building Confidence in Delivering on Pollution Reductions to Local Waters

Delaware Partners BMP Verification Meeting

March 26, 2015

Chesapeake Bay Program

A Watershed Partnership

Delaware Credentials

- Daughter is a Blue Hen—Class of 2012
- Being an out-of-state parent, made a $ignificant four-year investment in DE's economy
- 30+ years of purchasing DE fishing licenses
- Decades of putting up with John Schneider (starting with his days in Florida!)

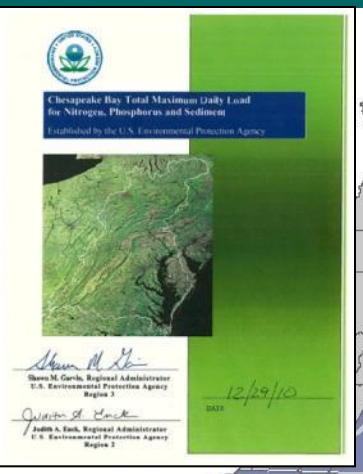
What is BMP Verification?

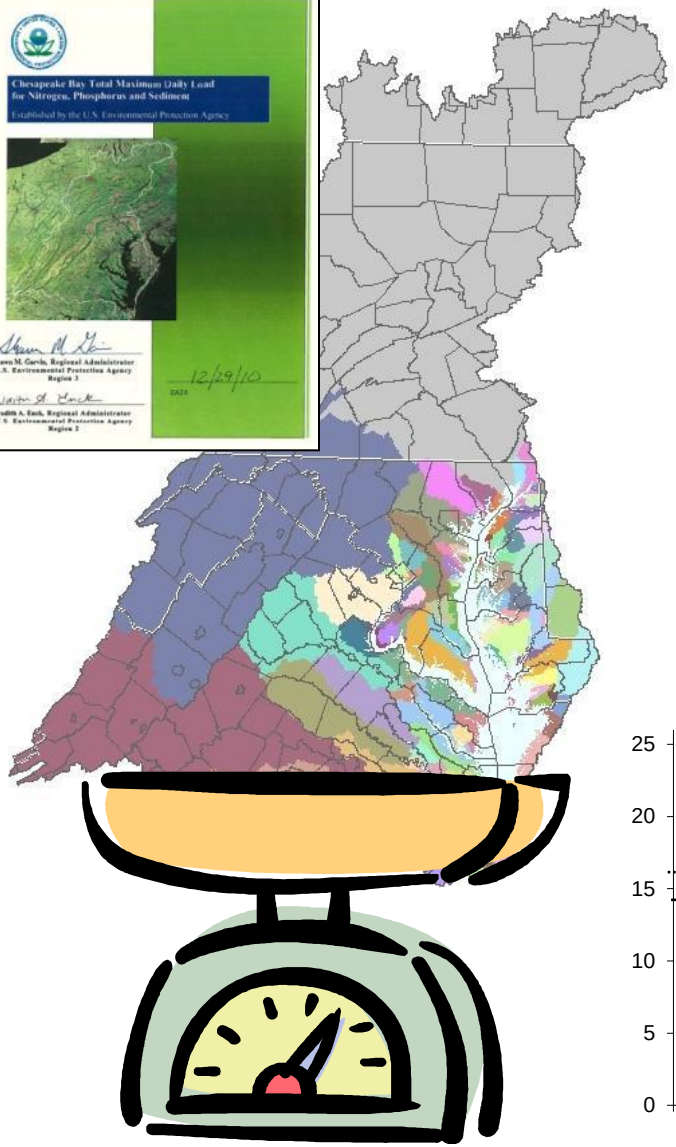
"**Verification**: the process through which agency partners ensure practices, treatments, and technologies resulting in reductions of nitrogen, phosphorus, and sediment pollutant loads are implemented and operating correctly."

“…implemented and operating correctly.”

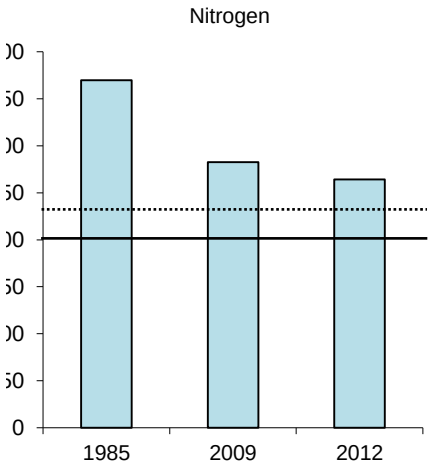
Why Verify BMPs?

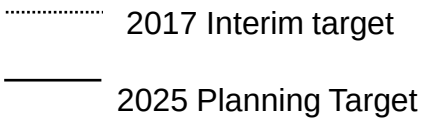
Chesapeake Bay TMDL: Pollution Diet for All Sectors and Sources



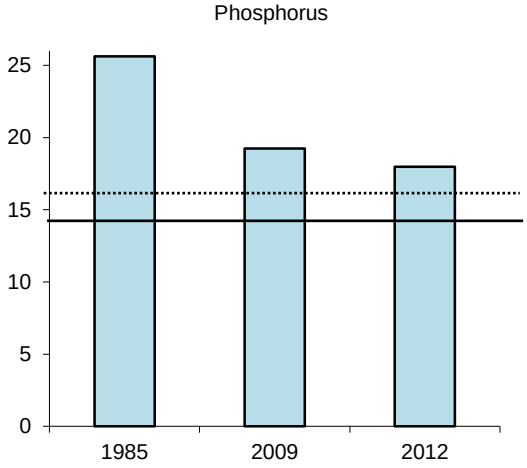


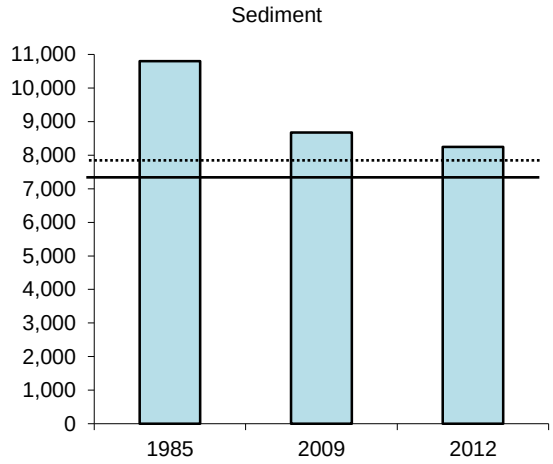
Pollution Delivered to the Bay (million pounds/year)





Simulated Pollution Loads Delivered to the Bay (million pounds/year)

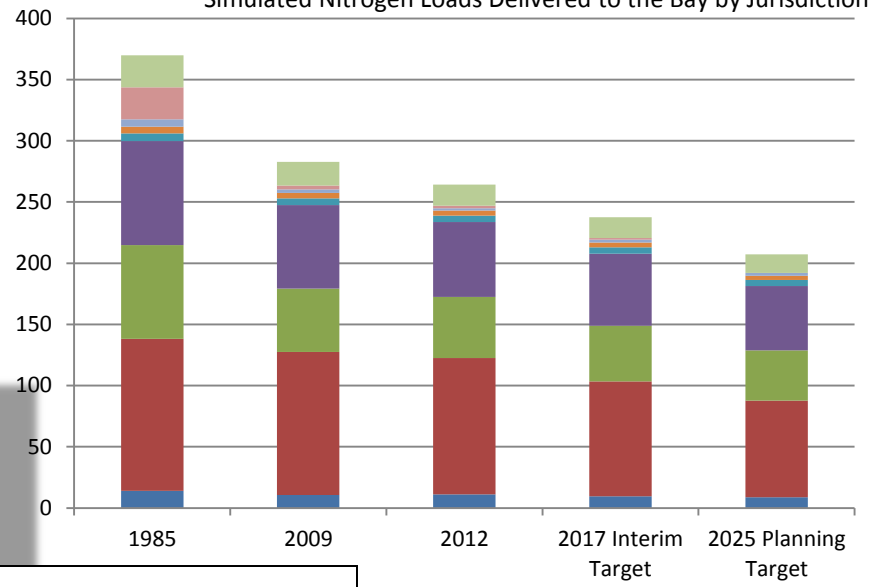




BayTAS

Chesapeake Bay TMDL Tracking and Accounting System

Simulated Nitrogen Loads Delivered to the Bay by Jurisdiction* (million pounds/



atershed Model and wastewater discharge data reported by Bay jurisdictions..

Chesapeake Bay Watershed 2009-2011 Milestones

Interim Progress Assessment/Fact Sheet - June 2011

Chesapeake Bay Program
A Watershed Partnership

Introduction

During the 2009 Chesapeake Executive Council (EC) meeting, the go
of the Bay watershed jurisdictions - Maryland, Virginia, Pennsylvania,
Virginia, New York and the District of Columbia - set short-term goa
tion to the Bay and dramatically accelerate the pace of restoration. Th
tional commitments will result in reducing nitrogen by 15.8 million po
ons by 1.05 million pounds during the three-year period, 2009-2011. A
ment of pollution control practices being implemented to achieve the
lows.

This interim progress assessment compares 2008 (the baseline year pe
the milestone period) and 2010 (the most recent reporting period, whi
implemented July 2009-June 2010). Bay jurisdictions have reported ou
committed to implement in their "2011 Milestones to Reduce Nitrogen and Phosphorus" further
calculation of percent completion to date. This assessment looks at progress for approximately tw
thirds of the 2009-2011 milestones period. Therefore, jurisdictions who have implemented practic
that are approximately two-thirds of the way to meeting their commitments are considered to be
"on track." Progress that was significantly more than two-thirds is reported as "ahead of schedule
while results that were significantly less are noted as "behind schedule."

As of June 2010, the jurisdictions are generally on-track to implement pollution control practices
necessary to achieve load reduction commitments. In instances where they are behind, contingen-
cies are being implemented. A final assessment of load reductions achieved during the entire three
year period will be available at next year's EC meeting.

Snapshot: How are the jurisdictions doing on meeting their commitme

Jurisdiction	Status	Notes
VA, DE	Generally on-track.	In instances wher behind on specifi substituted other "contingencies") tion reduction co
PA, WV	Generally ahead of schedule.	
NY	Generally ahead of schedule for some practices, behind for others.	
MD	Generally ahead of schedule.	More current info progress (through mented and avail
DC	Generally ahead of schedule.	

For more, contact Margaret Enloe (410) 267-5740, menloe@chesape

MARYLAND'S PHASE II WATERSHED IMPLEMENTATION PLAN
FOR THE CHESAPEAKE BAY TMDL

Maryland's Phase II Watershed Implementation Plan for the Chesapeake Bay TMDL

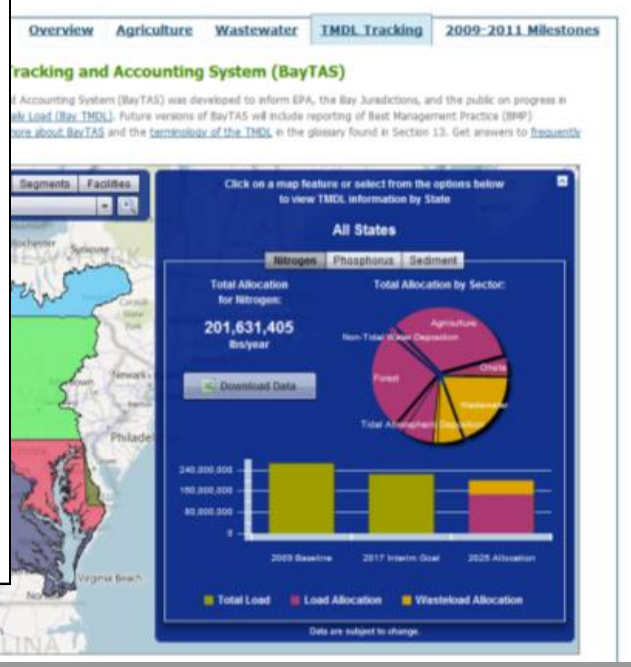
October 2012

MDP Maryland Department of Planning

MDE

MARYLAND DEPARTMENT OF NATURAL RESOURCES

Document version: October 26, 2012



- BMP Type and location (NEIEN/State supplied)
- Land acres
- Remote Sensing, NASS Crop land Data layer
- Crop acres
- Yield
- Animal Numbers (Ag Census or state supplied)
- Land applied biolsolids
- Septic system (#s)

Inputs

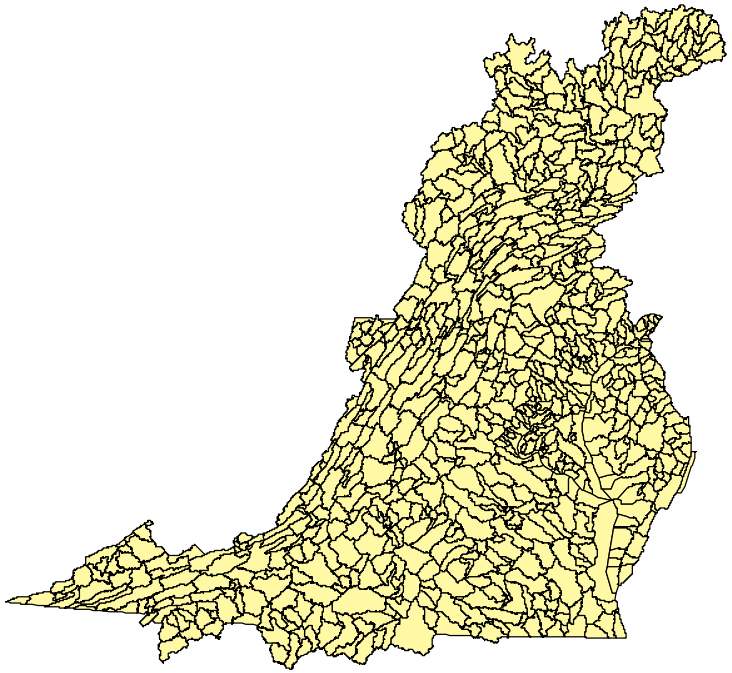
Parameters

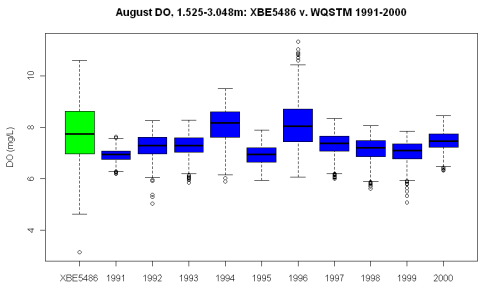
(Changeable by user)

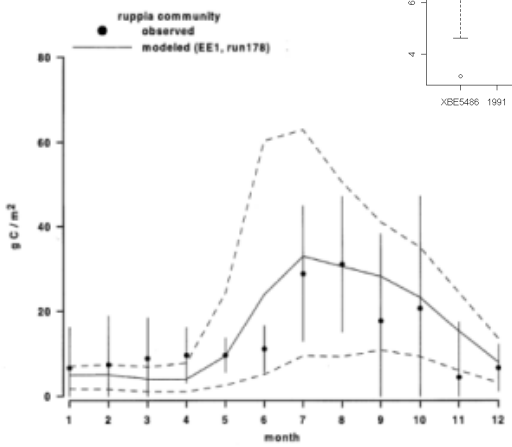
- BMP types and efficiencies
- Land use change (BMPs, others)
- RUSLE2 Data: % Leaf area and residue cover
- Plant and Harvest dates
- Best potential yield
- Animal factors (weight, phytase feed, manure amount and composition)
- Crop application rates and timing
- Plant nutrient uptake
- Time in pasture
- Storage loss
- Volatilization
- Animal manure to crops
- N fixation
- Septic delivery factors

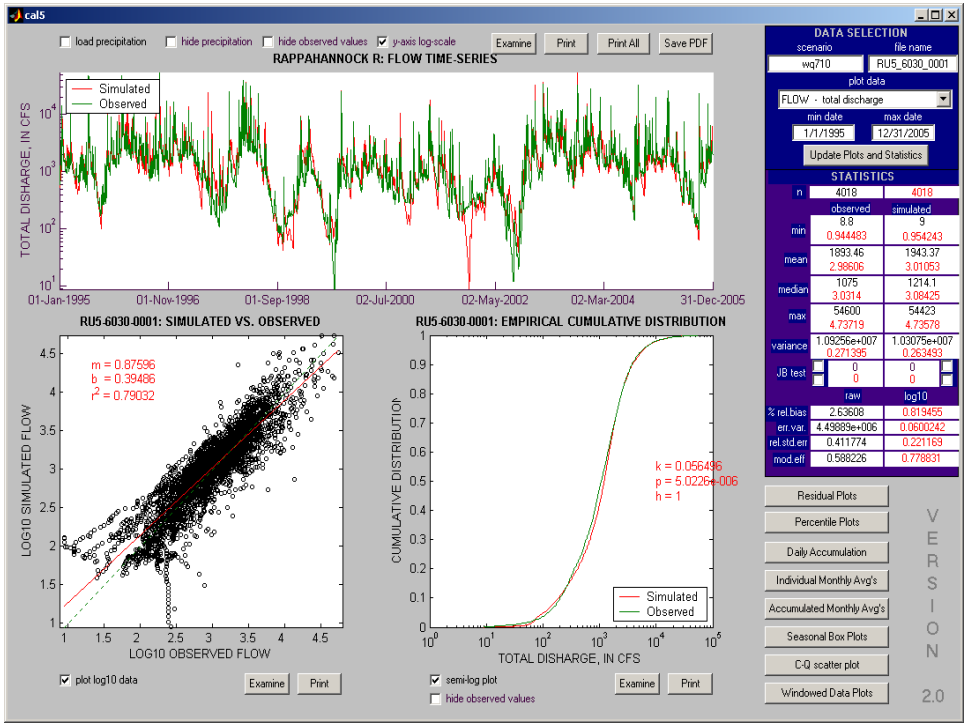
- BMPs, # and location
- Land use
- % Bare soil, available to erode
- Nutrient uptake
- Manure and chemical fertilizer (lb/segment)
- N fixation (lb/segment)
- Septic loads

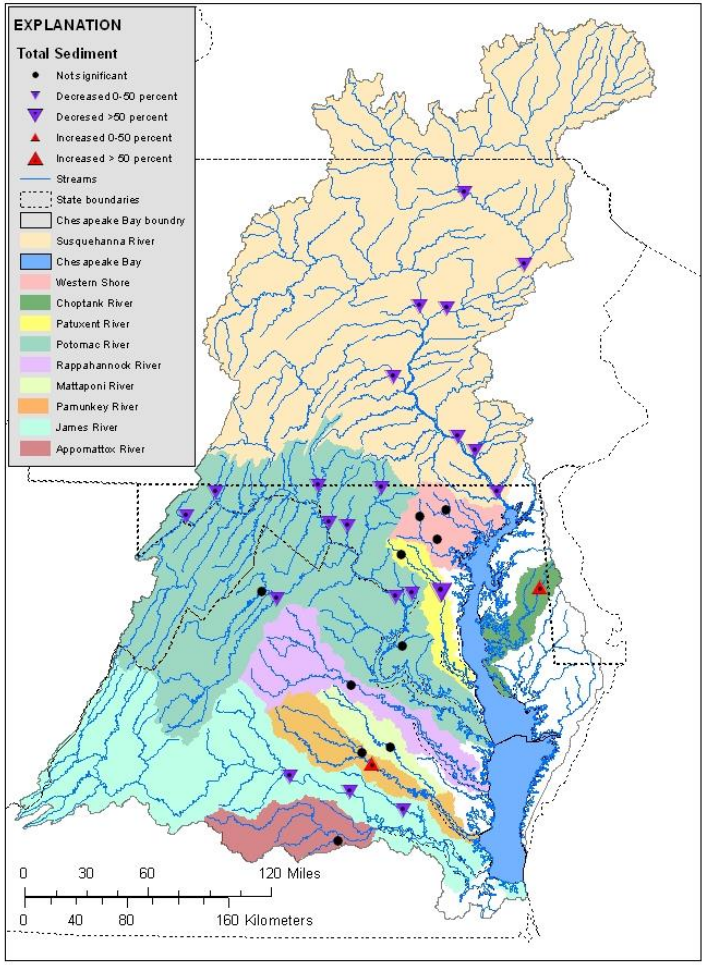
Outputs

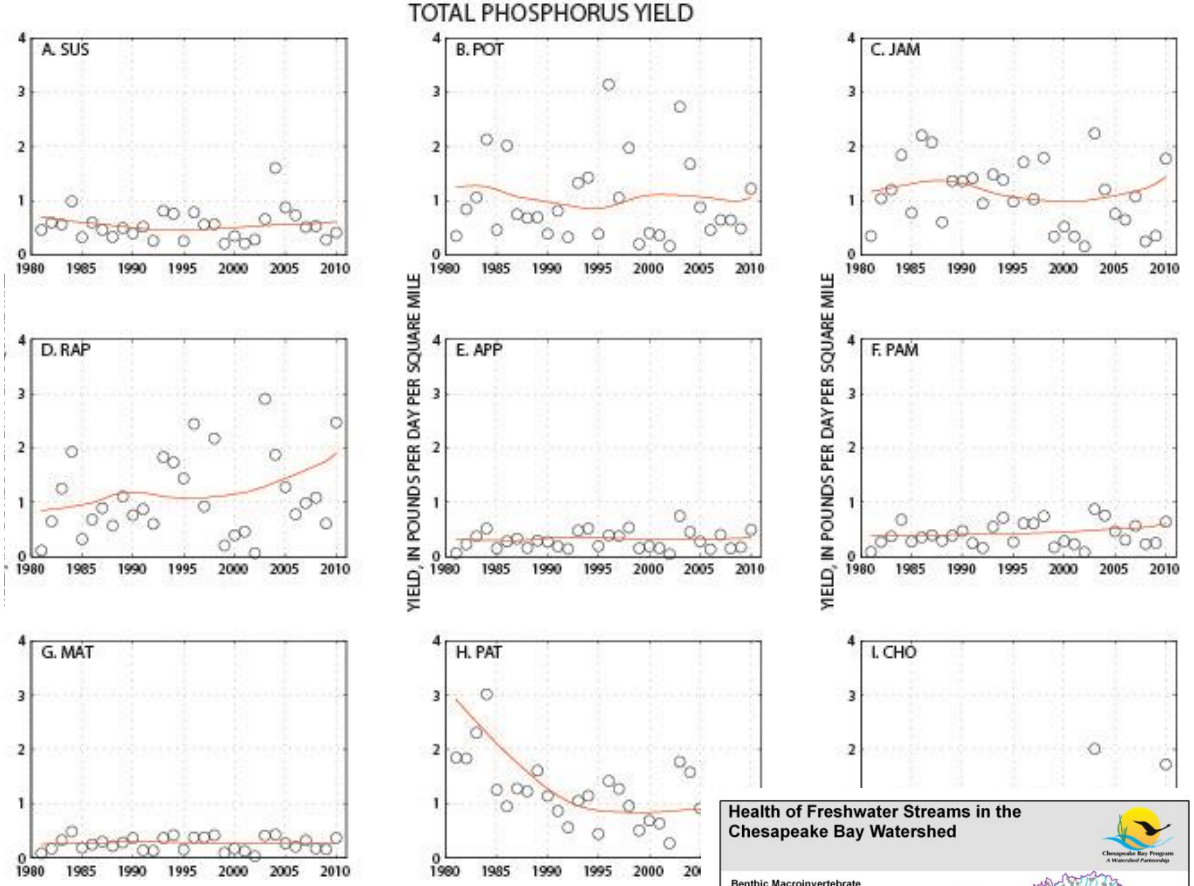


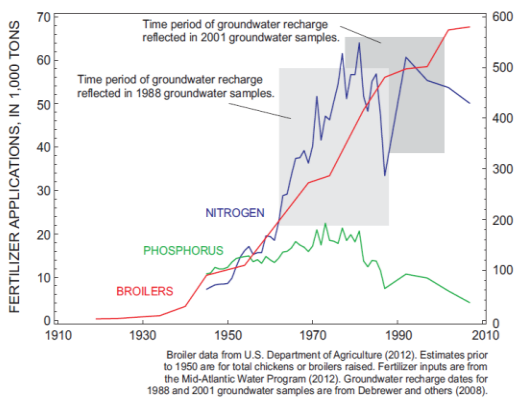


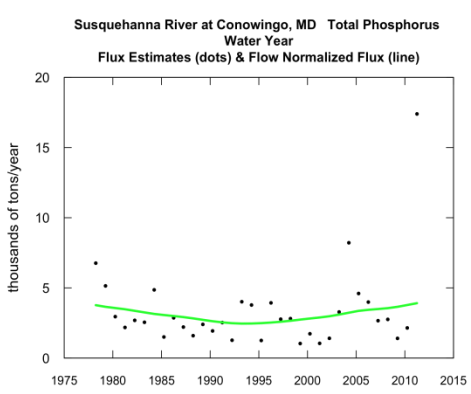


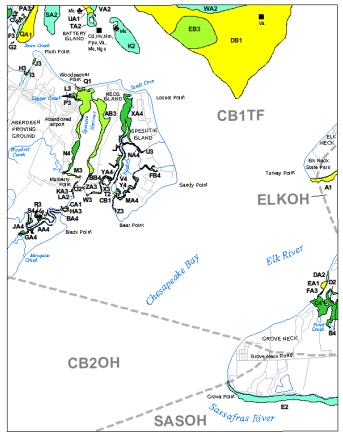


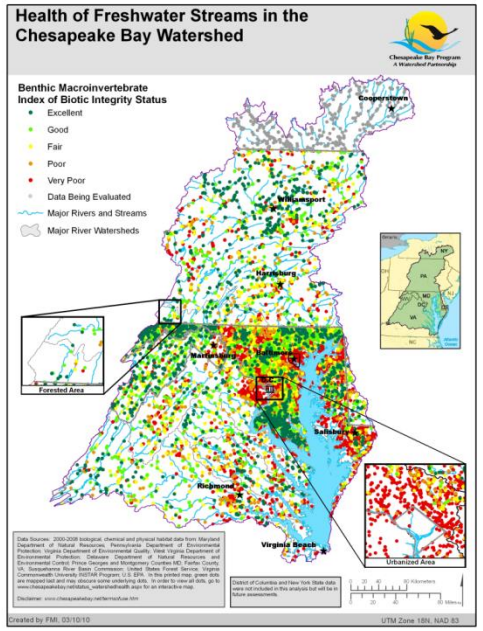

EXPLANATION
Total Sediment
Not significant
Decreased 0-50 percent
Decreased >50 percent
Increased 0-50 percent
Increased > 50 percent
Streams
State boundaries
Chesapeake Bay boundry
Susquehanna River
Chesapeake Bay
Western Shore
Choptank River
Patuxent River
Potomac River
Rappahannock River
Mattaponi River
Pamunkey River
James River
Appomattox River
0 30 60 120 Miles
0 40 80 160 Kilometers


TOTAL PHOSPHORUS YIELD
YIELD, IN POUNDS PER DAY PER SQUARE MILE
A. SUS
B. POT
C. JAM
D. RAP
E. APP
F. PAM
G. MAT
H. PAT
I. CHO
1980 1985 1990 1995 2000 2005 2010


FERTILIZER APPLICATIONS, IN 1,000 TONS
MILLIONS OF BROILERS SOLD
Time period of groundwater recharge reflected in 2001 groundwater samples.
Time period of groundwater recharge reflected in 1988 groundwater samples.
NITROGEN
PHOSPHORUS
BROILERS
1910 1930 1950 1970 1990 2010
Broiler data from U.S. Department of Agriculture (2012). Estimates prior to 1950 are for total chickens or broilers raised. Fertilizer inputs are from the Mid-Atlantic Water Program (2012). Groundwater recharge dates for 1988 and 2001 groundwater samples are from Debrewer and others (2008).


Susquehanna River at Conowingo, MD Total Phosphorus
Water Year
Flux Estimates (dots) & Flow Normalized Flux (line)
thousands of tons/year
1975 1980 1985 1990 1995 2000 2005 2010 2015


CB1TF
ELKOH
CB2OH
SASOH
Chesapeake Bay
Elk River
Sassafras River


Health of Freshwater Streams in the Chesapeake Bay Watershed
Benthic Macroinvertebrate Index of Biotic Integrity Status
Excellent
Good
Fair
Poor
Very Poor
Data Being Evaluated
Major Rivers and Streams
Major River Watersheds
Cooperstown
Williamsport
Harrisburg
Baltimore
Richmond
Virginia Beach
Forested Area
Urbanized Area

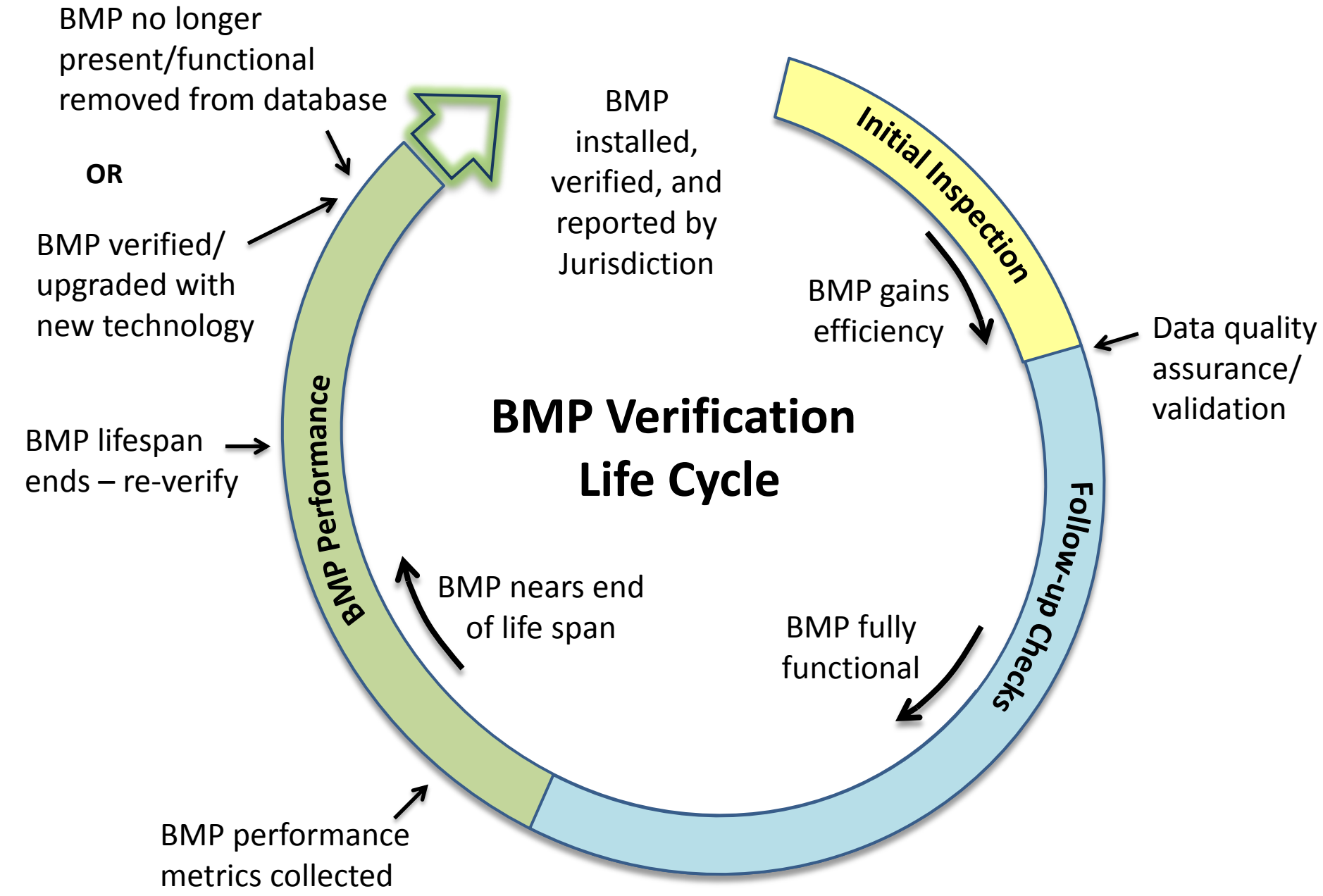
National Academy of Sciences

"The committee was unable to determine the reliability and accuracy of the BMP data reported by the Bay jurisdictions."

National Academy of Sciences

"The committee was unable to determine the **reliability** and **accuracy** of the BMP data reported by the Bay jurisdictions."

How?


BMP no longer present/functional removed from database
OR
BMP verified/ upgraded with new technology
BMP lifespan ends – re-verify
BMP performance metrics collected
BMP nears end of life span
BMP fully functional
BMP gains efficiency
Data quality assurance/ validation
BMP installed, verified, and reported by Jurisdiction
Initial Inspection
Follow-up Checks
BMP Performance
BMP Verification Life Cycle


Who?


2000 Gal
YESTERDA Y'S MEALS
on
WHEELS


05 13.2011 08 50

When?

September 2014 — Framework Adoption by the Partnership

October 2014-July 1, 2015 — Jurisdictions/Federal Agencies Development of Their BMP Verification Programs

July - October 2015 — External Panel Review of the Jurisdictions/ Federal Agencies' BMP Verification Programs

November - December 2015 — EPA Review and Approval of the Jurisdictions' BMP Verification Programs

2016-2017 — Jurisdictions Ramp-up Their Verification Program Implementation

2018 — Full Implementation of the Jurisdictions' Verification Programs

12 Framework Elements

- Verification principles
- Review Panel
- Sector verification guidance
- Practice life spans
- Full access to federal cost-shared practice data
- Enhanced reporting of federally cost shared practices
- Accounting for non-cost shared practices
- Preventing double counting
- Clean-up of historic BMP databases
- Documentation of jurisdictional BMP verification programs
- Evaluation and Oversight
- Communications and outreach

Verification Principles

- Practice reporting
- Scientific rigor
- Public confidence
- Adaptive management
- Sector equity

Agriculture Verification Guidance

- Defining and categorizing agricultural BMPs
- Defining implementation mechanisms
- Agricultural BMP verification methods
- Follow-up assessment guidelines

Forestry Verification Guidance

- Agricultural riparian forest buffers
- Agricultural tree planting
- Expanded tree planting
- Urban riparian forest buffers
- Forest harvesting BMPs

Stormwater Verification Guidance

- Regulated BMPs
- Semi-regulated BMPs
- Non-regulatory BMPs
- Legacy BMPs

Wastewater Verification Guidance

- Wastewater treatment facilities
- Combined sewer overflows
- Septic systems/septic system removals (connecting to wastewater treatment plants)
- Advanced on-site treatment systems

Wetlands Verification Guidance

- Wetland restoration, creation and enhancement
- Floodplain reconnection
- Project design and siting, pre- and post construction
- Inspection, maintenance, monitoring framework
- Field assessment checklist

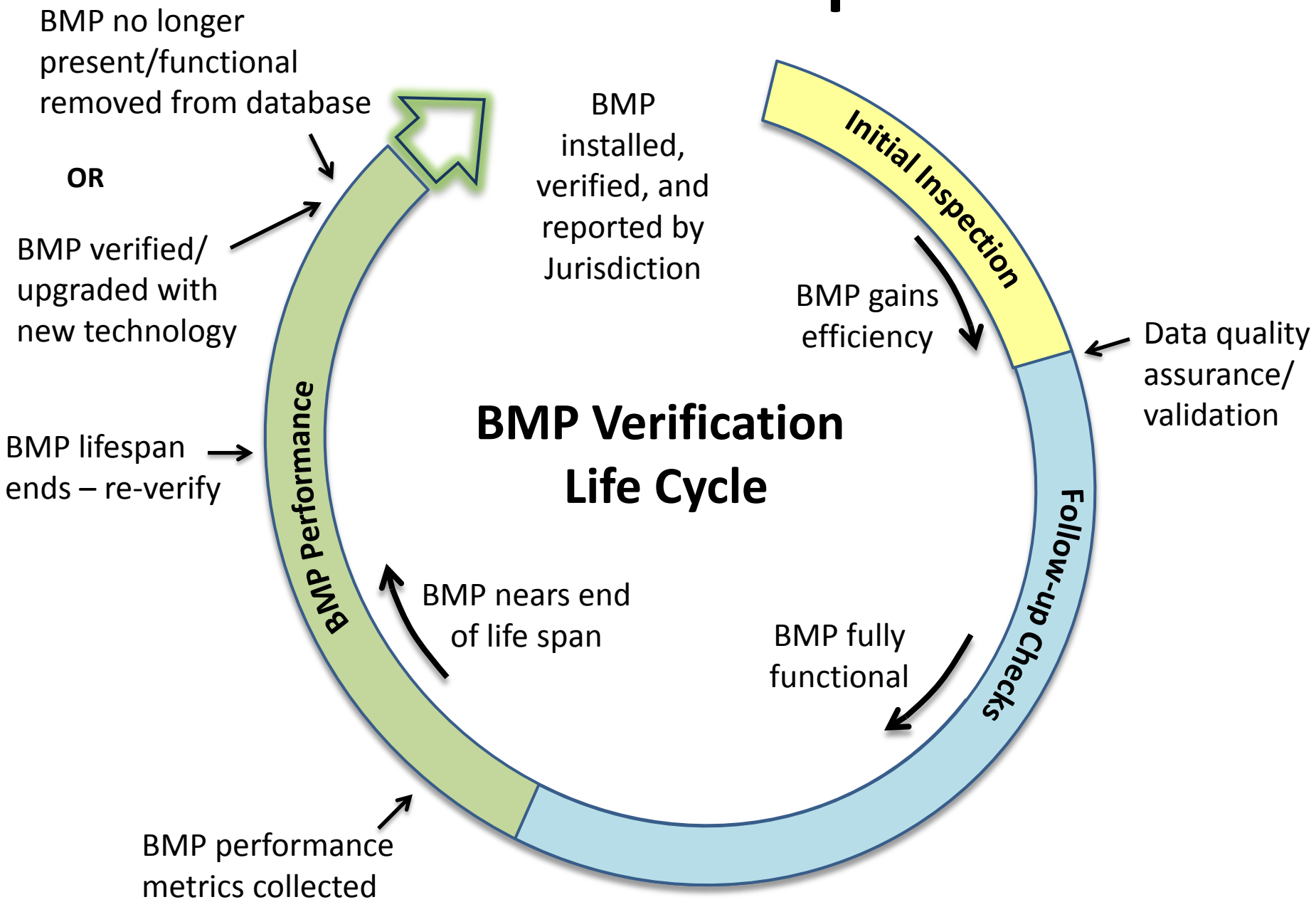
Streams Verification Guidance

- Individual stream restoration project verification
- Maintenance, monitoring tied to performance
- Inspection, maintenance, monitoring framework
- Initial verification of installation
- Recommended cycle of field verification

Transparency and Data Access

- Aggregated data considered transparent upon validation
- Treat cost-shared data and non-cost shared agricultural conservation practice data the same in terms of applying privacy restrictions
- Public access to all credited practice data

Practice Life Spans



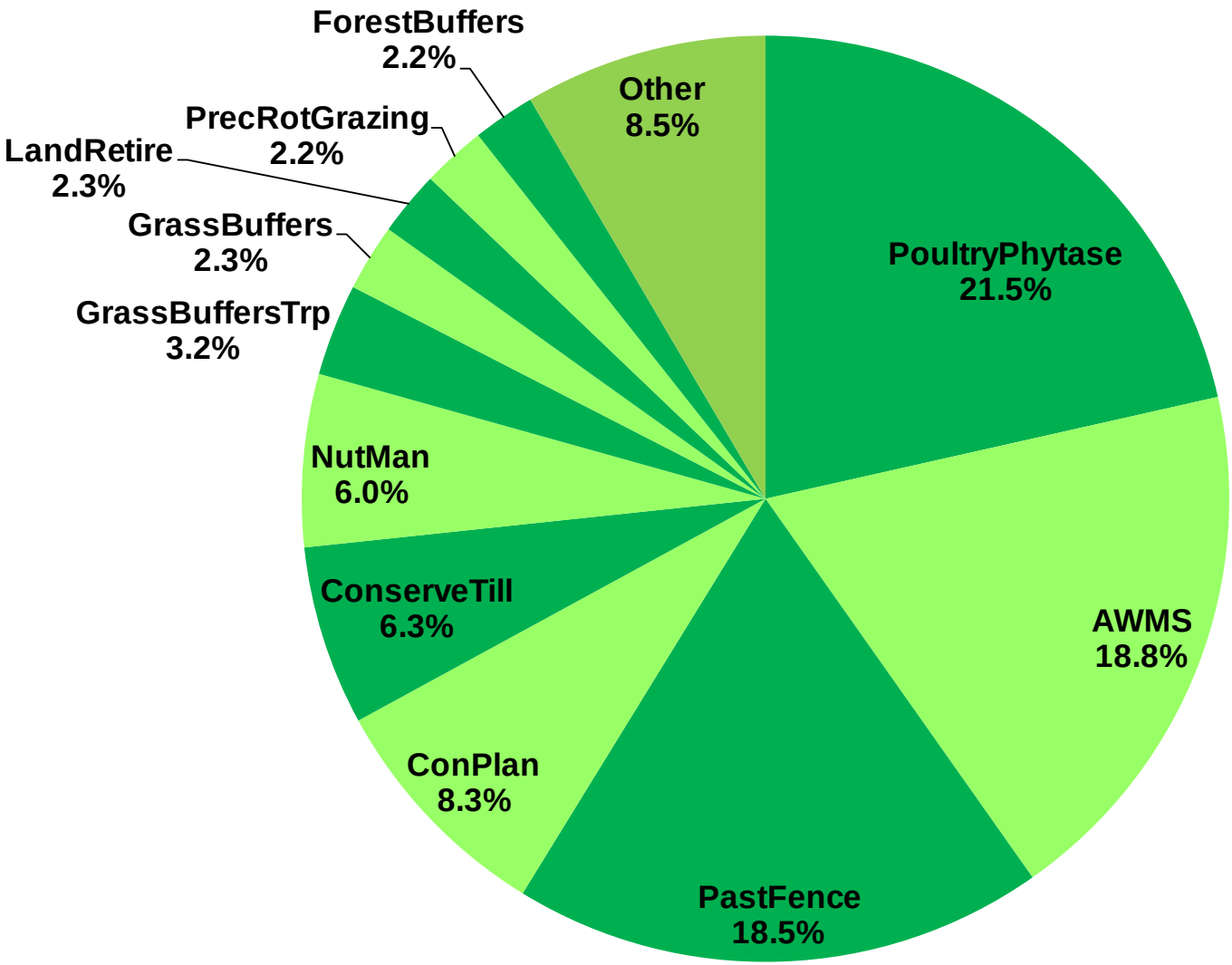
Federal Cost Shared Practices

- Data sharing agreements in place for all 6 states and all agencies involved in reporting
- Credit conservation technical assistance
- Hold USDA agencies accountable to commitment to enhance data reporting
- Common protocols and schedule for annual accessing of federal cost- shared data

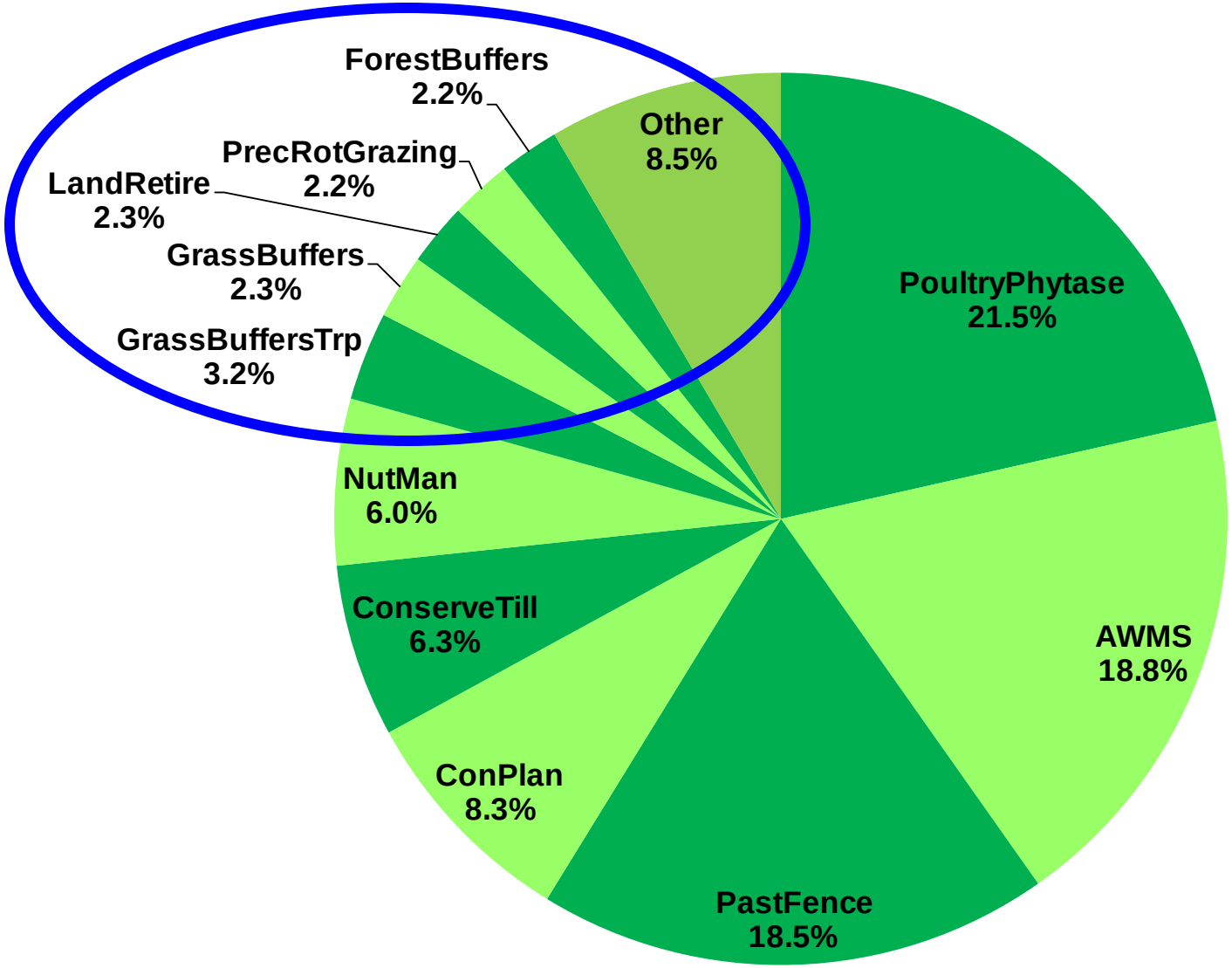
Accounting for Non-Cost Shared Practices

- Focused on practices implemented without cost share and not covered by a regulatory program
- Crediting practices that meet CBP or NRCS definitions and standards *and* CBP approved 'Resource Improvement Practices' implemented w/o public cost-share funds

Prioritize Verification Towards Priority Practices



Prioritize Verification Towards Priority Practices



Jurisdictions' Verification Programs

Chesapeake Bay Program Best Management Practice Verification Program Design Matrix

A. Program Component	B. Program Elements	C. Program Element Options
i. BMP Verification	1. What was the driver for BMP Installation?	Regulation, Cost-share, Non-cost-share
	2. How many BMPs will be inspected?	All, percentage, subsample, those targeted
	3. How is the frequency and location of inspectio	Statistics, targeting, law, available funding
	4. How ofte BMPs inspe	
	5. What is t	
	6. Who will inspection a certified/tra	

Jurisdictional BMP Verification Program
Development Decision Steps for Implementation

Below are the 14 steps for each Chesapeake Bay watershed jurisdiction to consider when developing their jurisdiction's BMP verification program. Under each step are questions for consideration which will prompt decisions that may be needed to develop jurisdiction's verification protocols.

1) **Determine what BMP's to collect:**
   a) Do you want to collect all BMPs that were listed to in your jurisdiction's Phase II WIP? Additional/or some o
   b) Do the listed BMPs m Program (CBP) defin
   c) Do you want to repor meet NRCS standard sediment pollutant lo
   d) When collecting the s
   e) For reported BMPs, a determination (examp date, fertilization if a

State Protocol Components Checklist

	State:			
	Sector:			
	BMP Verification	Present	N/A	Comments
1	**BMP's Collected**			
	Type (Structural, Management, Functional Equivalent, Etc)			
	BMP Funding/Cost shared (Federal, State, NGO, Non-cost shared)			
	Distinct State Standards/Specfications			
	Matching CBP Definition/Efficiencies			
2	**Method/ System of Verification/Assessment**			
	Description of Methods/Systems To Be Used			
	Documentation of procedures used to Verify BMP's			
	Instruction Manual for system users			

Jurisdictions' Verification Programs

Table 8. Jurisdictional Verification Protocol Design Table											
A. WIP Priority	**B. Data Grouping**	**C. BMP Type**	**D. Initial Inspection** *(Is the BMP there?)*				**E. Follow-up Check** *(Is the BMP still there?)*			**F. Lifespan/ Sunset** *(Is the BMP no longer there?)*	**G. Data QA, Recording & Reporting**
			Method	Frequency	Who inspects	Documentation	Follow-up Inspection	Statistical Sub-sample	Response if Problem		

Verification Implementation

Illustration of Diversity of Verification Approaches Tailored to Reflect Practices							
Sector	**Inspected**	**Frequency**	**Timing**	**Method**	**Inspector**	**Data Recorded**	**Scale**
Stormwater	All	Statistics	<1 year	Monitoring	Independent	Water quality data	Site
	Percentage	Targeting	1-3 yrs	Visual	Regulator	Meets Specs	Subwatershed
	Subsample	Law	3-5 yrs	Aerial	Non-Regulator	Visual functioning	County
	Targeted	Funding	>5 yrs	Phone Survey	Self	Location	State
Agriculture	All	Statistics	<1 year	Monitoring	Independent	Water quality data	Site
	Percentage	Targeting	1-3 yrs	Visual	Regulator	Meets Specs	Subwatershed
	Subsample	Law	3-5 yrs	Aerial	Non-Regulator	Visual functioning	County
	Targeted	Funding	>5 yrs	Phone Survey	Self	Location	State
Forestry	All	Statistics	<1 year	Monitoring	Independent	Water quality data	Site
	Percentage	Targeting	1-3 yrs	Visual	Regulator	Meets Specs	Subwatershed
	Subsample	Law	3-5 yrs	Aerial	Non-Regulator	Visual functioning	County
	Targeted	Funding	>5 yrs	Phone Survey	Self	Location	State

Evaluation and Oversight

- Amend Partnership BMP protocol to address verification
- Amend CBP Grant Guidance
- Annual reviews of progress data submissions
- Annual EPA reviews of changes to jurisdictions' quality assurance plans
- Periodic EPA audits of jurisdictions' BMP verification programs

Communications and Outreach

Goals:

- Build understanding of and support for BMP Verification
- Ensure consistent public messaging
- Manage expectations

Mechanisms

- Online news features
- Press releases
- Editorials
- Social media releases and messaging
- Photo essays and video products
- Web-based resources
- Supporting print materials
- Webinars, training sessions, and workshops

State and Local Partners' Roles

- Work towards **accounting for all implemented practices** which are reducing nutrient, sediment pollution
- Help message on **importance of verification** to restoring local stream health, habitats, and recreational areas and protecting sources of drinking water
- Make the investment and follow-through on demanding a **return on your investment**

Information Sources

http://www.chesapeakebay.net/groups/group/best_management_practices_bmp_verification_committee

- CBP Partnership' BMP Verification Committee
- CBP Partnership's BMP Review Panel
- Approved BMP verification principles
- Link to Dec 2013 USGS Agricultural Conservation Practices report

http://www.chesapeakebay.net/about/programs/bmpverification

- Final Chesapeake Bay Basinwide BMP verification framework report & appendices
- Source sector BMP verification guidance

Strengthening Verification of Best Management Practices Implemented in the Chesapeake Bay Watershed: A Basinwide Framework

Report and Documentation from the Chesapeake Bay Program Water Quality Goal Implementation Team's BMP Verification Committee

October 2014

Chesapeake Bay Program
Science. Restoration. Partnership.

Available Resources

- *DE Chesapeake Bay Grants*: CBIG, CBRAP
- *DE WIP Assistance Funds*: Tetra Tech contractual support
- *Virginia Tech Cooperative Agreement*: access to statistical survey design experts
- *Source Sector Workgroup Coordinators*: Ag, Stormwater, Wastewater, Forestry, Wetlands, and Streams
- *Source Sector webinars:* being scheduled for this spring and summer
- *Your* State and DC Partners!

Rich Batiuk

Chair
Chesapeake Bay Program Partnership's
BMP Verification Committee

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Questions